ARCO FACILITY AND CAR WASH PROJECT
ACOUSTICAL STUDY
City of Huntington Beach, California

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City of Huntington Beach
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ATTACHMENT NO. 5.1

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1.0 Executive Summary

This acoustical analysis and design evaluates the potential noise impacts and necessary mitigation measures for the Arco Facility and Car Wash project. The project is located at the northwest corner of Brookhurst Street and Hamilton Avenue in the City of Huntington Beach, as indicated in Exhibit A. The site plan used for this analysis, provided by C&M DESIGN CONCEPT, is presented in Exhibit B. The proposed project will consists of approximately 2,400 square feet (ft^2) of an Arco AM-PM convenience store, a 3,485 ft^2 fuel canopy with six gasoline dispensers, and a 980 ft^2 of self served car wash. The noise regulations for the project site are listed in the *Noise Standard* section of the study.

A detailed list of required and recommended noise control measures is presented in the Summary of Mitigation Requirements section of this study (also graphically illustrated on Exhibit D). The noise control analysis and recommendations in this study are intended to satisfy the City of Huntington Beach Conditions of Approval, with respect to this project.

1.1 Stationary Noise Analysis

The stationary noise impacts associated with the proposed project would include car wash equipment noise.

To approximate the noise levels associated with the proposed project, noise level data from existing gas stations and car wash equipment with similar parameters have been collected and presented in Appendix D. The noise levels associated with stationary noise such as car wash equipment activities were monitored by RK. These referenced noise levels can be found in Table 2 and are used as the reference noise levels.

To help assess the potential noise impacts of the proposed project, two daytime (7AM – 10PM) and two nighttime (10PM – 7AM) short-term noise measurements

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were taken the project site and the existing residential community northeast of the project site. Short-term noise monitoring location 1 (ST-1) was taken approximately 100 feet east of the easterly property line of the project site, near the existing residential units. Short-term noise monitoring location 2 (ST-2) was taken approximately 25 feet west of the easterly property line and 50 feet south of the northerly property line, within the confines of the project site.

ST-1 is approximately 130 feet east of the future car wash. ST-1 represents the approximate existing ambient noise near the residential units. By inputting the referenced and measured noise levels associated with the project site, future noise levels were calculated. The projected Noise Equivalency Level (Leq) to the residential units will range from 49.8 to 53.7 dBA Leq during nighttime and daytime hours.

ST-2 represents the ambient noise levels currently at the project site. ST-2 represents the existing noise levels on the project site. The existing Leq is approximately 64.0 dBA during the day and 59.8 dBA during the night.

The results of the acoustical analysis indicate that noise levels associated with the project site will be below the City's noise regulations with the implementation of the recommended noise mitigation measures and will not impact the adjacent land uses.

1.2 Roadway Noise Analysis

A roadway noise analysis was performed to assess the anticipated roadway noise levels associated with the project site.

A significant impact is considered to be a noise level increase of 5 dBA for roadway segments surrounding the project site and/ or a noise level increase of 3 dBA or greater exceeding the normally acceptable 75 dBA CNEL exterior standard for commercial land uses.

The results of the acoustical analysis indicate that the proposed project will not increase the roadway noise levels. The project site currently experiences a noise level of approximately 67.1 dBA CNEL at a distance of 100 feet from the analyzed roadways indicated in Table 5. The project will therefore not generate a substantial increase in the roadway ambient noise levels in excess of the City's regulatory standards. The impact is not significant.

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2.0 Summary of Mitigation Requirements

Two different noise standards, stationary noise impacts and roadway noise impacts from the City of Huntington Beach's Municipal Code and Noise Element, were assessed respectively. The results of the stationary noise assessment include the effects of the existing measured ambient noise levels within the project site combined with the projected adjusted project noise as detailed in Tables 2 through 4. The results of the roadway CNEL analysis include the short-term noise measurements at the project site and is detailed in Table 5. Typical construction noise levels associated with construction equipment is indicated in Table 6. A summary of all noise requirements, recommendations and locations are shown on Exhibits D.

The proposed project is not expected to exceed the City's noise thresholds for commercial developments, and therefore no mitigation is required. However, to ensure noise levels remain low there are several recommendations which should be followed to help reduce noise impacts the surrounding environment and the project site.

2.1 Stationary Noise Reduction Measures

- During operation, the operators should ensure all car wash equipment is equipped with appropriate noise attenuation devices and secured in properly sealed equipment room.

- If noise complaints demonstrate that a significant impact is affecting sensitive receptors due to operation activities (noise levels as measured at the receptor location at a level in excess of the City's noise significant thresholds), the City should require owner to apply appropriate measures to reduce the impacts of noise on the sensitive receptor to levels within the City's noise standards.

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a. Maximize physical separation, as far as practical between noise generators and sensitive noise receptors.

2.2 Construction Noise Reduction Measures

Construction operations must follow the noise ordinance which states that operations must occur between the hours of 7:00 AM to 8:00 PM, Monday through Saturday only. A number of noise reduction measures are suggested to minimize noise impacts.

- During construction, the contractor should ensure all construction equipment is equipped with appropriate noise attenuating devices.
- Maximize physical separation, as far as practical between noise generators and sensitive noise receptors.
- Idling equipment should be turned off when not in use.
- Equipment will be maintained so that parts of vehicles and their loads are secured from rattling and banging.

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3.0 Introduction

This study evaluates potential on-site and off-site noise impacts to and from the Arco Facility and Car Wash project by assessing the stationary and roadway noise impacts generated by project operations and local traffic. The Arco Facility and Car Wash project is located at the northwest corner of Brookhurst Street and Hamilton Avenue in the City of Huntington Beach.

The general location of the project is shown in the Location Map, Exhibit A. The site plan used for this analysis, provided by C&M DESIGN CONCEPT is presented on Exhibit B.

The following sections outline the expected noise levels within the planned site and compare these noise levels to the applicable noise regulations. The design requirements and recommendations, as outlined in the *Summary of Mitigation Requirements* section of this study, are intended to satisfy the City of Huntington Beach noise regulations.

3.1 Noise Regulations

The acoustical parameters include the Municipal Code and the Noise Element from the City of Huntington Beach's General Plan is included in Appendix A. The noise regulations include stationary noise impacts, roadway noise impacts and temporary construction noise impacts.

3.1.1 Stationary Noise Regulations

The stationary noise impacts, as defined by the City Municipal Code, should not exceed exterior residential noise intrusion standard during the daytime (7 AM to 10 PM) and nighttime (10 PM to 7 AM) shown below in Figure 1.

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Figure 1

Municipal Code Stationary Noise Standards

	Time	Noise Criteria Level (dBA)					
		Cumulative Time Period	0 Minutes	1 Minute	5 Minutes	15 Minutes	30 minutes
		Symbol	L_{max}	L_2	L_8	L_{25}	L_{50}
Exterior	Daytime (7 AM to 10 PM)		75.0	70.0	65.0	60.0	55.0
Exterior	Nighttime (10 PM to 7 AM)		70.0	65.0	60.0	55.0	50.0
Interior	Daytime (7 AM to 10 PM)		55.0	50.0	45.0	N/A	N/A
Interior	Nighttime (10 PM to 7 AM)		45.0	40.0	35.0	N/A	N/A

A common way of describing noise levels from stationary sources is with the percent noise level ($L_{\%}$). The percent noise level indicates the noise level which is exceeded during a certain percentage of time and represents the average noise level. Appendix B contains more definitions and examples.

3.1.2 Roadway Noise Regulations

Typically roadway noise impacts, as defined by the City of Huntington Beach's General Plan at the normally acceptable level should be below the 75 dBA CNEL exterior and 45 dBA CNEL interior for commercial land use and 60 dBA CNEL exterior and 45 dBA CNEL interior for resdential land use threshold.

3.1.3 Construction Noise Regulations

The City of Huntington Beach has adopted the Performance Standards set forth by the City's Municipal Code. Construction noise is prohibited between the hours of

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8:00 PM to 7:00 AM on weekdays, including Saturdays, or at any time on Sundays or Federal Holidays. Construction noise is defined as noise which is disturbing, excessive or offensive and constitutes a nuisance involving discomfort or annoyance to persons of normal sensitivity residing in the area, which is generated by the use of any tools, machinery or equipment used in connection with construction operations.

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4.0 Study Method and Procedure

A glossary of acoustical terms is included in Appendix B.

4.1 Stationary Noise Modeling

The stationary source noise analysis uses a version of the Federal Highway Administration (FHWA) Traffic Noise Prediction Model (FHWA-RD-77-108), together with several key site parameters, to project the expected impacts on the existing adjacent land uses as a result of the proposed development. Key inputs include noise attributed to the typical stationary noise sources (i.e., car wash equipment, loading dock noise and speakerphone noise along with specific distances).

Similar performance equations including relative source-barrier-receiver horizontal separations, relative source-barrier-receiver vertical separations, typical noise source spectra, and barrier transmission loss from the stationary noise model were utilized to complete the stationary source model.

Receiver Geometry

Horizontal Geometry: Distance behind top-of-slope barrier: (varies)

Vertical Geometry: Refer to CNEL noise model:

Source Assumptions

Horizontal Geometry: Stationary noise source distance based upon building locations and adjacent land sensitive use receivers.

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Vertical Geometry: Height above pad grade for each stationary source. These assumptions and the site plan (Exhibit B) were used to fix the horizontal and vertical geometry used in the barrier analysis.

The stationary source model incorporates the City's Municipal Code Regulations and is defined in the *Noise Standard* section of the report. The current ambient conditions do not exceed the thresholds and the projected future noise levels are not expected to exceed the thresholds.

4.2 CNEL Roadway Noise Modeling

The CNEL Roadway noise analysis uses a version of the Federal Highway Administration (FHWA) Traffic Noise Prediction Model (FHWA-RD-77-108), together with several key roadway and site parameters. Key inputs include roadway classification (e.g. Freeway, Major Arterial Street, Primary Arterial Street, Secondary Arterial Street and Collector Arterial Street), roadway active width (the distance between the center of the outer most travel lanes on each side of the roadway), maximum vehicle capacity Average Daily Traffic (ADT), travel speed, percentages of automobiles, medium trucks and heavy trucks in the roadway volume, roadway grade, angle of view, site conditions ("hard" or "soft"), and percent of total ADT which flows each hour throughout a 24-hour period.

Using the Noise Barrier Calculations and the key parameters, a barrier analysis was performed to determine noise computations. The key input data for these barrier performance equations include relative source-barrier-receiver horizontal separations, relative source-barrier-receiver vertical separations, typical noise source spectra, and barrier transmission loss. Some of the general assumptions used in determining the source and receiver geometry are listed below:

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Receiver Geometry

Horizontal Geometry: Distance behind top-of-slope barrier: 10 feet

Vertical Geometry: Height above pad for ground level receivers:

Exterior:	5 feet above ground
1st Floor Interior:	5 feet above finished floor
2nd Floor Interior:	15 feet above finished floor

Source Assumptions

Horizontal Geometry: For roadways with grades no greater than 2%, all vehicles are located at the single-lane equivalent acoustical center of the full roadway. For roadways with over 2% grade, vehicle count is divided in half and is located at the single-lane acoustical equivalent for each side of the roadway.

Vertical Geometry: Height above road grade:

Autos:	2.0 feet
Medium Trucks:	4.0 feet
Heavy Trucks:	8.0 feet

The CNEL model calculates the noise impacts produced by adjacent roadways. The output of the model was compared to the Commercial Land Use Noise Standards found in the Noise Element. The City has an exterior normally acceptable exterior residential standard of 75 dBA CNEL. The projected exterior noise impact is approximately 67.1 dBA CNEL at 100 feet from the center line of the subject roadway. The change in the traffic volume as a result of the project is minimal, when compared to the overall ADT along the subject roadways. The project's traffic contribution will have no impact on the overall roadway noise to the surrounding area. The impact is not significant.

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4.3 Noise Measurements

Noise measurements are taken to determine the existing noise levels. A noise receiver or receptor is any location in the noise analysis in which noise might produce an impact. The following criteria are used to select measurement locations and receptors:

- Locations expected to receive the highest noise impacts, such as first row of houses
- Locations that are acoustically representative and equivalent of the area of concern
- Human land usage
- Sites clear of major obstruction and contamination

Noise measurements were conducted on July 21, 2008 using a Larson Davis 712 sound level meter. Noise monitoring locations are indicated in Table 1 and Exhibit C. The following gives a brief description of the Caltrans Technical Noise Supplement procedures:

- Microphones for sound level meters were placed 5-feet above the ground for all measurements
- Sound level meters were calibrated before and after each measurement
- Following the calibration of equipment, a wind screen was placed over the microphone
- Frequency weighting was set on "A" and slow response
- Results of the short-term noise measurements were recorded on field data sheets
- During short-term noise measurements any noise contaminations such as barking dogs, local traffic, lawn mowers, or aircraft fly-overs were noted
- Temperature and sky conditions were observed and documented

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5.0 Existing Noise Environment

RK visited the project site on July 21, 2008 to obtain ambient noise data during the day and night hours. An existing gas station is located where the Arco Facility and Car Wash project is proposed. The locations of the monitoring sites are shown in Exhibits C.

5.1 Project Site

On July 21, 2008 two (2) daytime and nighttime short-term noise measurements were conducted at the project site to obtain and evaluate the existing ambient noise levels during the day and night. Table 1 indicates the short-term noise data collected at the project site.

The proposed project will consists of approximately 2,400 square feet (ft^2) of an Arco AM-PM convenience store, a 3,485 ft^2 fuel canopy with six gasoline dispensers, and a 980 ft^2 of self served car wash. It is expected that the existing project site will be will be demolished to accommodate the new buildings. The measurement locations and monitoring results are listed in Exhibit C and Table 1. Photographs of the measurement sites are shown in Appendix C. The short-term noise measurement at the project site indicates that the existing traffic noise levels and ambient noise levels are below the City's exterior noise standard. The relative distance of the noise meter location is described in Appendix C.

The land use located to the northeast of the project site consists of residential units and therefore the noise study compares the City's not-to-exceed residential noise limits to the predicted stationary noise from the project site.

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6.0 Future Noise Environment and Impacts

6.1 Future Exterior Noise

The future exterior noise levels analyze stationary noise impacts and roadway noise impacts associated with the project site.

6.1.1 Stationary Source Noise

The stationary noise impact thresholds, as defined by the City's Municipal Code, are shown in *Figure 1 Section 3.1.1*. The stationary noise impacts associated with the proposed project would include car wash equipment. The noise impacts will vary with operation use.

Noise levels from the proposed project are not anticipated to have a significant impact to the nearest sensitive land uses (residential). The worst-case noise level from the project site will range from 53.4 to 53.7 dBA Leq during daytime hours and 49.8 to 50.5 dBA Leq during the evening hours. The projected first and second floor noise levels take into account the existing car garages on the residential property side; however do not take into account any potential mitigation provided by the building shell design and properly sealed equipment room. Tables 3 and 4 indicate the anticipated noise levels from the proposed car wash equipment to the adjacent residential units. The existing car garages along the eastern property line will shield noise impacts to the adjacent residential units. No significant noise impact is anticipated.

6.1.2 Roadway Noise Data

The City has a normally acceptable exterior residential standard of 65 dBA CNEL and higher acceptable noise level for commercial land use. It is expected that roadway

traffic along Brookhurst Street and Hamilton Avenue will be the main source of off-site roadway noise impacting the project site. According the City's General Plan, Brookhurst Street is a major arterial street with a vehicle capacity of 45,000 ADT. Hamilton Avenue is a primary arterial street with a vehicle capacity of 30,000 ADT. The project currently generates approximately 200 ADT, per the environmental assessment review. It is expected that the project will generate an additional 170 ADT after the development. In order to achieve a 3 dB increase in noise, the overall ADT would have to double along one of the major cross streets near the project site. Roadway noise is not expected to increase as a result of the proposed project because the project does not generate a substantial amount of trips. Table 5 indicates the projected future roadway noise will be approximately 67.1 dBA CNEL at a distance of 100 feet from the centerline of the roadways. **No mitigation is required since this is not a significant noise impact.** Appendix E demonstrates the roadway calculations.

7.0 Construction Noise Impacts

The Municipal Code includes the noise standards construction noise activities which may impact an adjacent private property. Construction activities must not take place between the hours of 8:00 PM and 7:00 AM on weekdays, including Saturdays, or at anytime on Sunday or a Federal Holiday (please refer to *Section 3.1.3*). Noise levels from construction are considered exempt; however they must follow the allowable hours of operation.

The degree of construction noise may vary for different areas of the project site and also vary depending on the construction activities. It is estimated that construction will take approximately two to three months to raze, construct, utilities, concrete and building shell. Noise levels associated with the construction will vary with the different phases of construction.

Construction noise is expected to be the worse during the grading and concrete phases of construction. The following is a list of heavy construction equipment which will be utilized during construction. It is expected that one (1) bulldozer and (1) backhoe will be used during construction.

The Environmental Protection Agency (EPA) has compiled data regarding the noise generated characteristics of typical construction activities. The data is presented in Table 5. These noise levels would diminish rapidly with distance from the construction site at a rate of 6 dBA per doubling of distance. For example a noise level of 86 dBA measured 50 feet from the noise source would reduce to 80 dBA at 100 feet. At 200 feet from the noise source the noise level would reduce to 74 dBA. At 400 feet the noise source would reduce by another 6 dBA to 68 dBA. During the construction period, the contractors would be required to comply with the Municipal Code of the City of Huntington Beach as described in Appendix A.

The peak noise levels to the residential units are expected to be approximately 60.3 to 64.3 dBA as indicated in Appendix F. These noise levels take into account the

wall along the east property line. Several noise reduction measures can be implemented by the contractor to further reduce construction noise impacts. Please refer to *Section 2.2 Construction Noise Reduction Measures* of this report.

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8.0 Conclusions

RK has completed an acoustical analysis of the Arco Facility and Car Wash project, located in the City of Huntington Beach. The project was assessed with respect to on-site and off-site generated noise. The projected stationary noise analysis indicates that noise levels associated with the project will be below the City's regulations. The roadway noise analysis indicates that there will be no significant impact to the surrounding area from the project. The construction noise analysis indicates that there will be no significant long-term impact to the residential units northeast of the project site.

The following conclusions for the Arco Facility and Car Wash project are listed below:

- The stationary car wash noise impacts from the project site along with the City of Huntington Beach Noise Standard's are shown in Tables 2 through 4. Stationary noise impacts are below the City's standards and are considered less than significant. The existing wall will provide sufficient shielding to the residential units northeast of the project site.
- The roadway noise impacts as a result of the proposed project are indicated in Table 5. Roadway noise impacts are below the City's standard and therefore considered less than significant.
- The temporary construction noise impacts from the project site are considered exempt per the Municipal Code (8.40.090(d)). Construction noise must follow the allowable hours of operation.

A number of noise reduction measures are recommended in the report. A summary of these recommendations can be found in *Section 2.0 (pages 2-1 to 2-2)* of this report. The analysis and design presented in this study comply with applicable City of Huntington Beach requirements for control of community noise impacts to exterior residential land use.

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Exhibits

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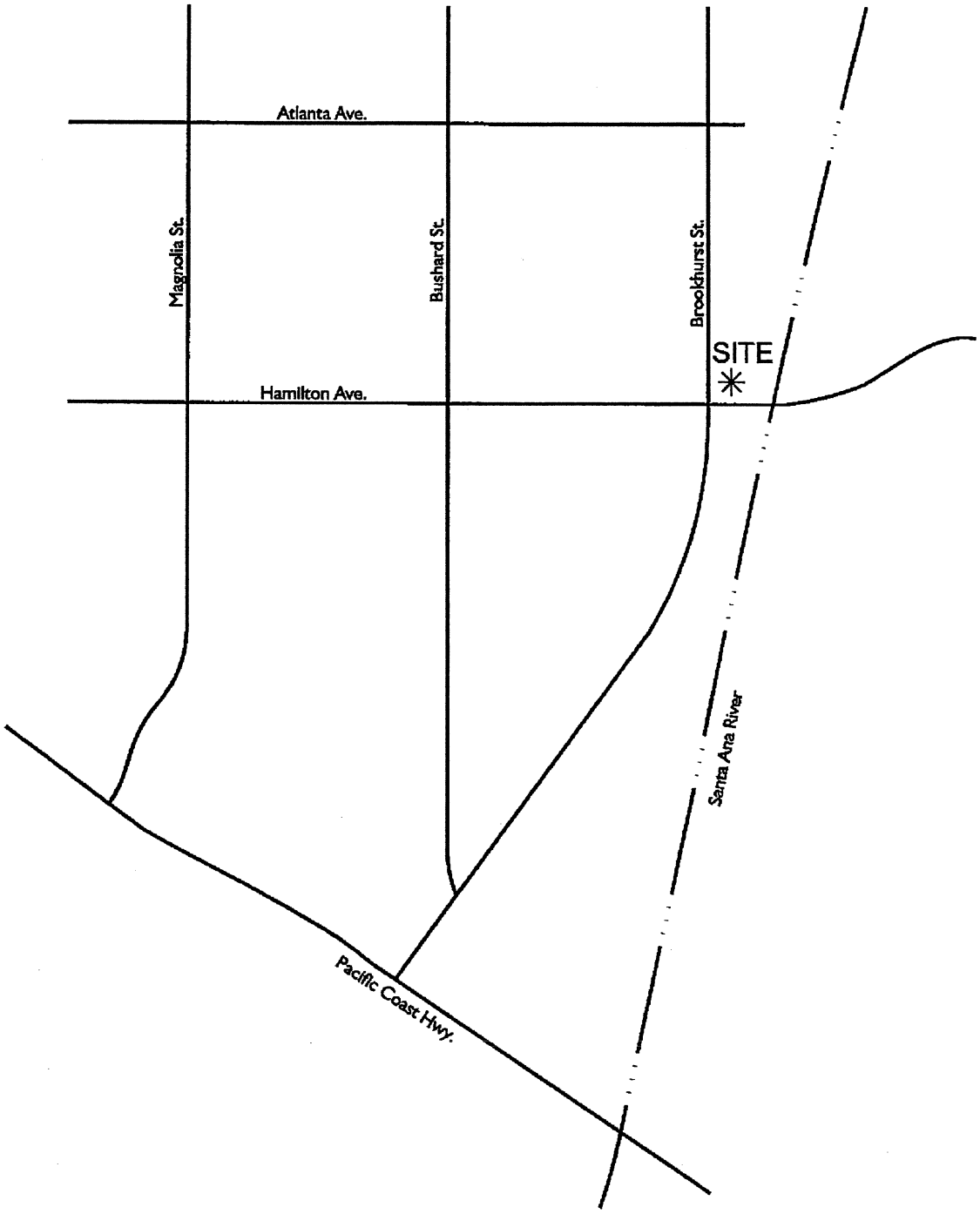
Exhibit A
Location Map



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ARCO FACILITY AND CAR WASH ACOUSTICAL STUDY, Huntington Beach, California

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Exhibit B
Site Plan

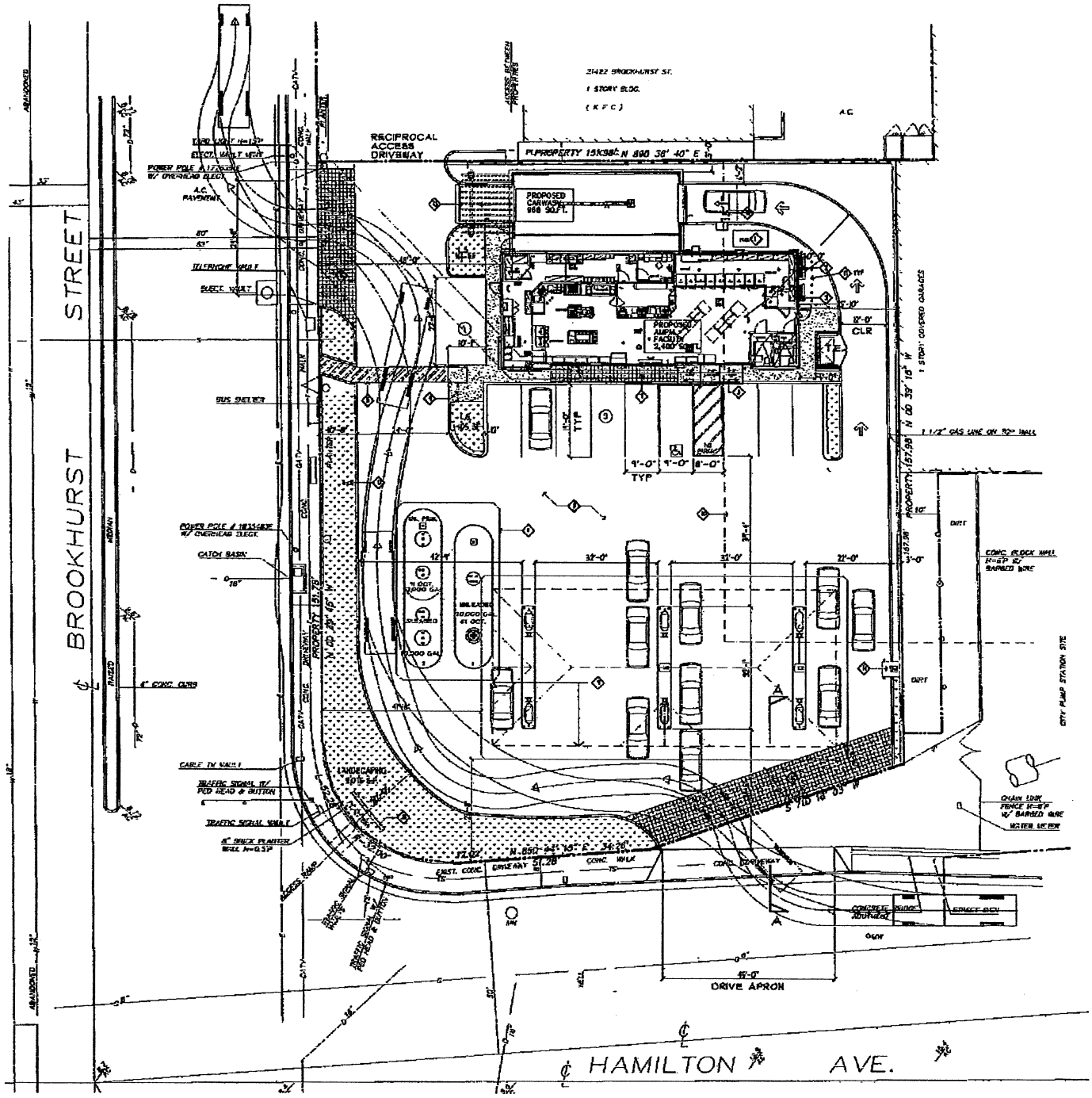

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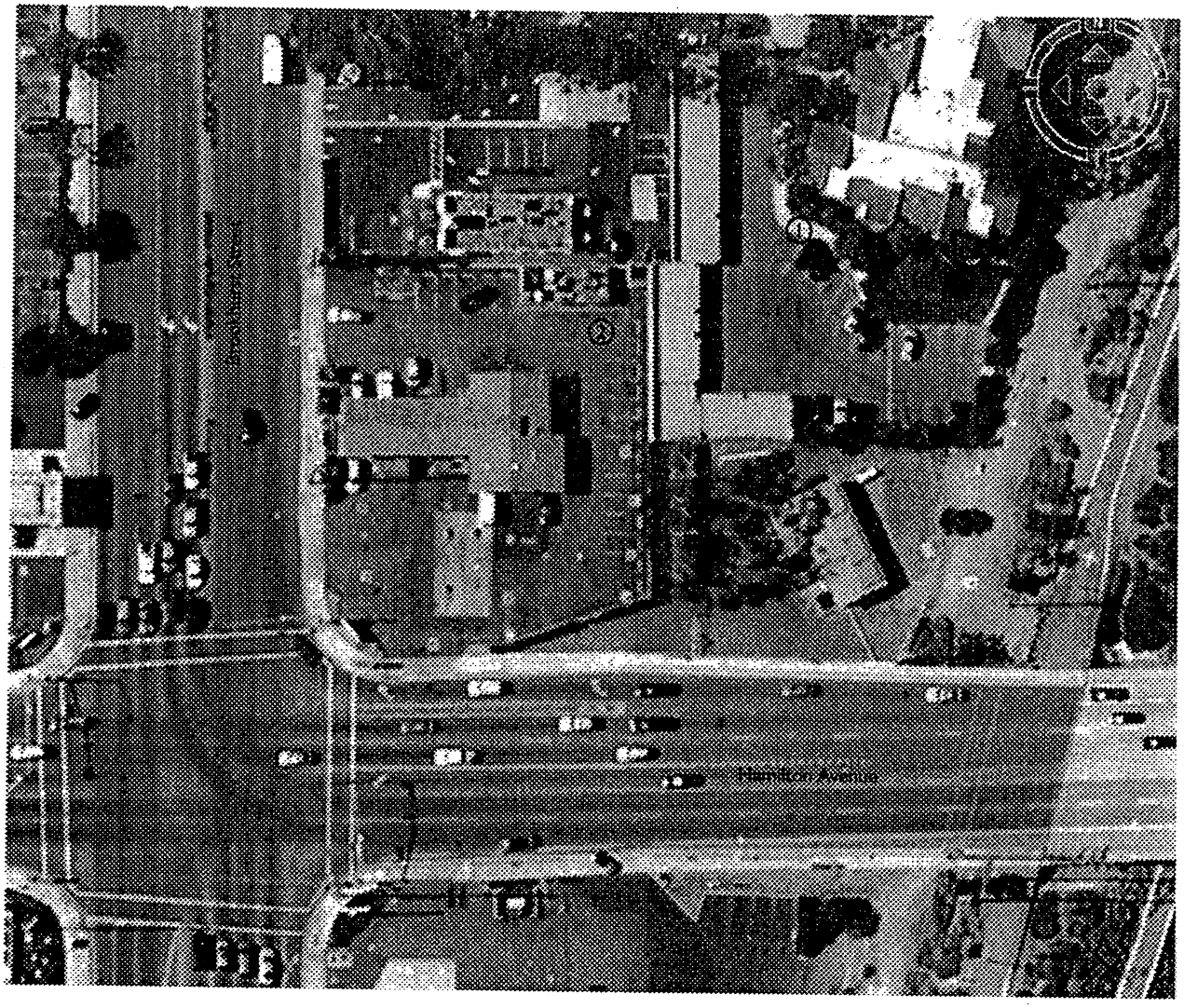
Exhibit C

Noise Monitoring Location



Legend:

① = Short-Term Noise Monitoring Location

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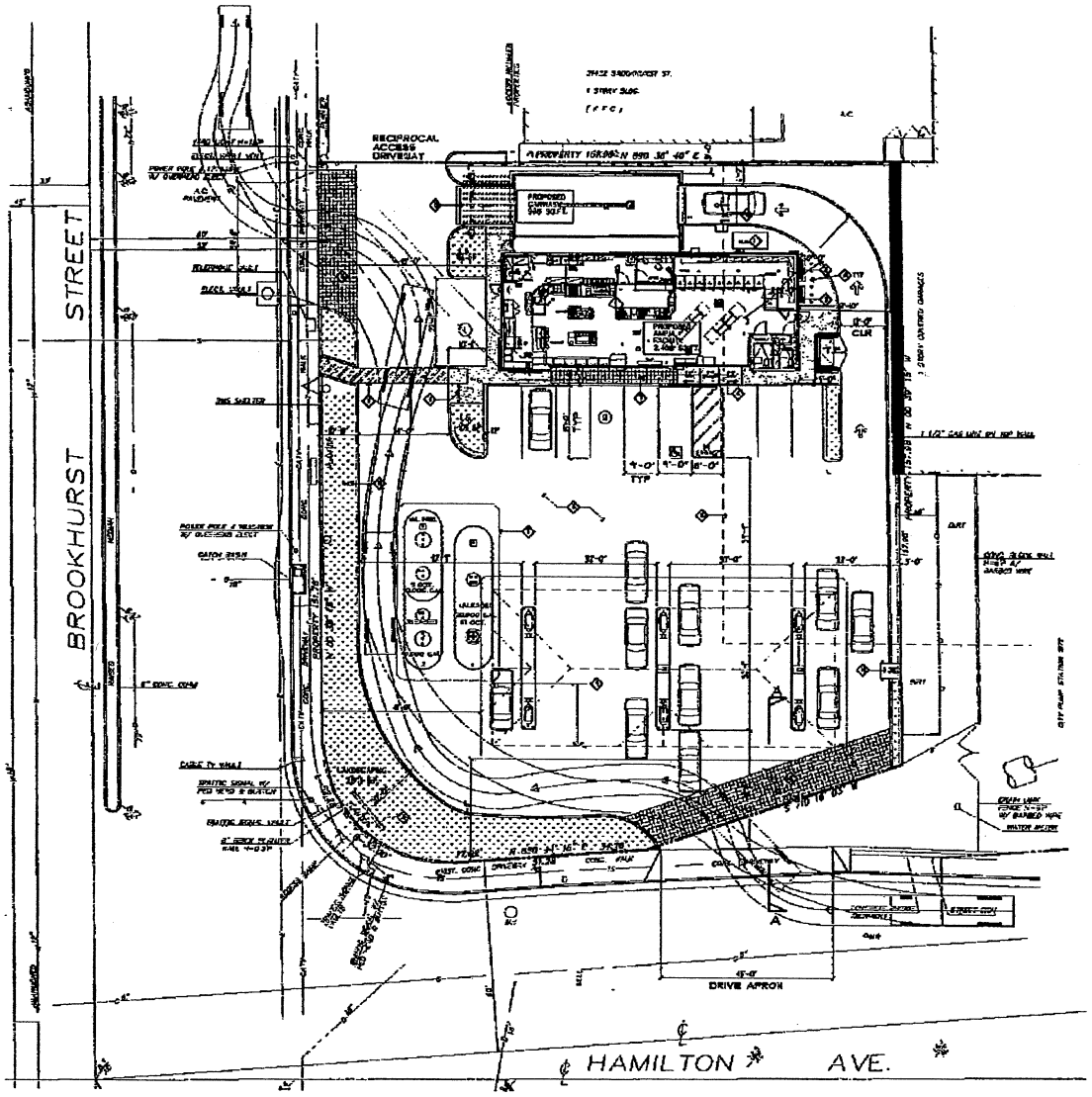
Exhibit D

Recommended Mitigation



During operation, the operators should ensure all car wash equipment is equipped with appropriate noise attenuation devices and secured in properly sealed equipment room.

Construction operations must follow the noise ordinance which states that operations must occur between the hours of 7:00 AM and 8:00 PM, Monday through Saturday only. A number of noise reduction measures are suggested to minimize noise impacts.

- During construction, the contractor should ensure all construction equipment is equipped with appropriate noise attenuating devices.
- Maximize physical seperation, as far as practical between noise generators and sensitive receptors.
- Idling equipment should be turned off when not in use.
- Equipment will be maintained so that parts of vehicles and their loads are secured from rattling and banging.

Legend:

= Existing 10 ft. wall

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Tables

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TABLE 1

Noise Level Measurements

Measured Noise Level (dBA)

Site No.	Time Started[1]	Leq	L_{max}	L_{min}	L_2	L_8	L_{25}	L_{50}	Comments
1	11:04 AM[2]	53.0	72.2	46.9	56.9	55.0	53.0	51.6	Measurement taken @ Sea Spray Condos. Noise Hamilton Ave.
1	10:05 PM[2]	48.8	64.9	42.0	55.2	51.0	48.9	47.4	Measurement taken @ Sea Spray Condos. Noise from Hamilton Ave . & residents insdide condos
2	11:38 AM[2]	64.0	75.0	57.8	69.5	67.9	64.7	62.3	Measurement taken @ Project Site. Ambient noise from Brookhurst/Hamilton and Project Site.
2	10:22 PM[2]	59.8	73.9	56.1	65.7	62.2	59.6	58.1	Taken @ Project Site. Ambient noise from facility equipment and Brookhurst and Hamilton.

[1] Noise measurements taken on July 21, 2008.

[2] Noise measurements were taken for 10 minutes at the site.

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TABLE 2

Referenced and Adjusted Car Wash Equipment Noise Level Measurements

Source	Referenced Measured Noise Levels (dBA)						
	Distance from Reference Source (feet)	L_{eq}	L_{max}	L_2	L_8	L_{25}	L_{50}
Car Wash Equipment[1]	15.0	69.4	73.1	72.4	71.6	70.6	69.6

	Source	Adjusted Noise Levels (dBA)[1]						
		Distance from Reference Source (feet)	L_{eq}	L_{max}	L_2	L_8	L_{25}	L_{50}
1st Floor Residential Units	Car Wash Equipment	130	42.7	46.4	45.7	44.9	43.9	42.9
2nd Floor Residential Units	Car Wash Equipment	130	45.7	49.4	48.7	47.9	46.9	45.9

[1] Adjusted Noise Levels (dBA) were calculated based on distance (Appendix C).

TABLE 3

Projected 1st Floor Exterior Noise Levels at Residential Units (dBA)[1]

	Source	Daytime Adjusted Noise Levels w/ existing 10ft. wall (dBA)						
		Distance from Reference Source (feet)	L_{eq}	L_{max}	L_2	L_8	L_{25}	L_{50}
1st Floor Residential Units	Car Wash Equipment[2]	130	42.7	46.4	45.7	44.9	43.9	42.9
	Existing Ambient Measurement[3]	--	53.0	72.2	56.9	55.0	53.0	51.6
	Unmitigated Total Combined Noise Impact[4]	--	53.4	72.2	57.2	55.4	53.5	52.1
	City of Huntington Beach not to exceed Noise Standards	--	--	75.0	70.0	65.0	60.0	55.0
	Change in Noise Level as a result of Car Wash	--	--	0.0	0.3	0.4	0.5	0.5

	Source	Nightime Adjusted Noise Levels w/ existing 10ft. wall (dBA)						
		Distance from Reference Source (feet)	L_{eq}	L_{max}	L_2	L_8	L_{25}	L_{50}
1st Floor Residential Units	Car Wash Equipment[2]	130	42.7	46.4	45.7	44.9	43.9	42.9
	Existing Ambient Measurement[3]	--	48.8	64.9	55.2	51.0	48.9	47.4
	Unmitigated Total Combined Noise Impact[4]	--	49.8	65.0	55.7	52.0	50.1	48.7
	City of Murrieta not to exceed Noise Standards	--	--	70.0	65.0	60.0	55.0	50.0
	Change in Noise Level as a result of Car Wash	--	--	0.1	0.5	1.0	1.2	1.3

* Bold number indicates noise standard was will be exceeded

[1] Exterior noise levels calculated approximately 20 feet from residential units' façade

[2] See Appendix C for reference level to adjusted level conversion calculation printout

[3] Ambient Measurement taken from Table 1 and adjusted to residential units

[4] See Appendix C for dBA calculating

TABLE 4

Projected 2nd Floor Exterior Noise Levels at Residential Units (dBA)[1]

	Source	Daytime Adjusted Noise Levels w/ existing 10ft. wall (dBA)						
		Distance from Reference Source (feet)	L_{eq}	L_{max}	L_2	L_8	L_{25}	L_{50}
2nd Floor Residential Units	Car Wash Equipment[2]	130	45.7	49.4	48.7	47.9	46.9	45.9
	Existing Ambient Measurement[3]	--	53.0	72.2	56.9	55.0	53.0	51.6
	Unmitigated Total Combined Noise Impact[4]	--	53.7	72.2	57.5	55.8	54.0	52.6
	City of Huntington Beach not to exceed Noise Standards	--	--	70.0	65.0	60.0	55.0	50.0
	Change in Noise Level as a result of Car Wash	--	--	0.0	0.6	0.8	1.0	1.0

	Source	Nightime Adjusted Noise Levels w/ existing 10ft. wall (dBA)						
		Distance from Reference Source (feet)	L_{eq}	L_{max}	L_2	L_8	L_{25}	L_{50}
2nd Floor Residential Units	Car Wash Equipment[2]	130	45.7	49.4	48.7	47.9	46.9	45.9
	Existing Ambient Measurement[3]	--	48.8	64.9	55.2	51.0	48.9	47.4
	Unmitigated Total Combined Noise Impact[4]	--	50.5	65.0	56.1	52.7	51.0	49.7
	City of Murrieta not to exceed Noise Standards	--	--	70.0	65.0	60.0	55.0	50.0
	Change in Noise Level as a result of Car Wash	--	--	0.1	0.9	1.7	2.1	2.3

* Bold number indicates noise standard was will be exceeded

[1] Exterior noise levels calculated approximately 20 feet from residential units' façade

[2] See Appendix C for reference level to adjusted level conversion calculation printout

[3] Ambient Measurement taken from Table 1 and adjusted to residential units

[4] See Appendix C for dBA calculating

TABLE 5

Projected Traffic Noise Levels along Roadways (dBA CNEL)[1]

Road	Segement	CNEL AT 100 FEET (dBA)	Distance to Contour from Centerline of Roadway (Feet)		
			70 CNEL	65 CNEL	60 CNEL
Hamilton Avenue	East of Brookhurst	67.1	64	138	297

[1] Exterior noise levels calculated at ground level, 'x.x feet from centerline of subject roadway

[2] ADT volumes referenced from City of Huntington Beach Circulation Element (Appendix A)

[3] Refer to Appendix E fo projected noise level calculations.

TABLE 6
Typical Construction Noise Levels[1]

EQUIPMENT POWERED BY INTERAL COMBUTION ENGINES

Type	Noise Levels (dBA) at 50 Feet
Earth Moving	
Compactors (Rollers)	73 - 76
Front Loaders	73 - 84
Backhoes	73 - 92
Tractors	75 - 95
Scrapers, Graders	78 - 92
Pavers	85 - 87
Trucks	81 - 94
Materials Handling	
Concrete Mixers	72 - 87
Concrete Pumps	81 - 83
Cranes (Movable)	72 - 86
Cranes (Derrick)	85 - 87
Stationary	
Pumps	68 - 71
Generators	71 - 83
Compressors	75 - 86

IMPACT EQUIPMENT

Type	Noise Levels (dBA) at 50 Feet
Pneumatic Wrenches	82 - 87
Jack Hammers, Rock Drills	80 - 99
Pile Drivers (Peak)	95-105

OTHER

Type	Noise Levels (dBA) at 50 Feet
Vibrators	68 - 82
Saws	71 - 82

[1] Referenced Noise Levels from the Environmental Protection Agency (EPA)

j:/rktables/RK6681TB
JN:2050-2008-03

ATTACHMENT NO. 5.37

Appendices

ATTACHMENT NO. 5.38

Appendix A

City of Huntington Beach Acoustical
Standards and Parameters

ATTACHMENT NO. 5.39

Chapter 8.40

NOISE CONTROL

(1006-10/63, 1072-11/64, 1354-11/67, 1935-11/74, 2364-5/79,2379-7/79, Urg. 2434-5/80, 2533-2/82, 2788-9/85, 3131-4/92, 3216-12/93, 3514-12/01)

Sections:

8.40.010 Declaration of policy
8.40.020 Definitions
8.40.030 Noise level measurement criteria
8.40.040 Designated noise zones
8.40.050 Exterior noise standards
8.40.060 Exterior noise levels prohibited
8.40.070 Interior noise standards
8.40.080 Interior levels of noise prohibited
8.40.090 Special provisions
8.40.095 Leaf blowers
8.40.100 Schools, hospitals and churches--Special provisions
8.40.110 Air conditioning, refrigeration--Special provisions
8.40.111 Prohibited noises
8.40.112 Loud noises
8.40.120 Manner of enforcement
8.40.130 Variance procedure
8.40.140 Noise Variance Board
8.40.150 Appeals
8.40.160 Appeals--Notice of hearing
8.40.170 Action of council
8.40.180 Violations--Misdemeanor

8.40.010 Declaration of policy. In order to control unnecessary, excessive and annoying sounds emanating from incorporated areas of the City, it is hereby declared to be the policy of the City to prohibit such sounds generated from all sources as specified in this chapter.

It is determined that certain noise levels are detrimental to the public health, welfare and safety and contrary to public interest; therefore, the City Council does ordain and declare that creating, maintaining, causing or allowing to create, maintain or cause any noise in a manner prohibited by, or not in conformity with the provisions of this chapter, is a public nuisance and shall be punishable as such. (2379-7/79)

8.40.020 Definitions. The following words, phrases and terms as used in this chapter shall have the meaning as indicated below:

(a) "Ambient noise level" shall mean the all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding the alleged offensive noise, at the location and approximate time at which a comparison with the alleged offensive noise is to be made.

(b) "Commercial property" shall mean a parcel of real property which is developed and used either in part or in whole for commercial purposes including, but not limited to, retail and wholesale businesses and professional offices.

(c) "Cumulative period" shall mean an additive period or time composed of individual time segments which may be continuous or interrupted.

(d) "Decibel" (db) shall mean a unit which denotes the ratio between two (2) quantities which are proportional to power; the number of decibels corresponding to the ratio of two (2) amounts of power is ten (10) times the logarithm to the base ten (10) of this ratio.

ATTACHMENT NO. 5.40

(e) "Emergency machinery, vehicle or work" shall mean any machinery, vehicle or work used, employed or performed in an effort to protect, provide or restore safe conditions in the community or for the citizenry, or work by private or public utilities when restoring utility service.

(f) "Fixed noise source" shall mean a stationary device which creates sounds while fixed or motionless, including but not limited to, industrial and commercial machinery and equipment, pumps, fans, compressors, generators, air conditioners and refrigeration equipment.

(g) "Grading" shall mean any excavating or filling of earth material, or any combination thereof, conducted to prepare said site for construction or the placement of the improvements thereon.

(h) "Impact noise" shall mean the noise produced by the collision of one mass in motion with a second mass which may be either in motion or at rest.

(i) "Industrial property" shall mean a parcel of real property which is developed and used in part or in whole for manufacturing purposes including research and development uses.

(j) "Mobile noise source" shall mean any noise source other than a fixed noise source.

(k) "Noise level" shall mean the "A" weighted sound pressure level in decibels obtained by using a sound level meter at slow response with a reference pressure of twenty (20) micropascals (micronewtons per square meter). The unit of measurement shall be designated as db(A).

(l) "Person" shall mean a person, firm, association, co-partnership, joint venture, corporation or any entity, public or private in nature.

(m) "Residential property" shall mean a parcel of real property which is developed and used either in part or in whole for residential purposes, other than transient uses such as hotels or motels.

(n) "Predominant tone noise" shall mean a noise characterized by a predominant frequency or frequencies so that other frequencies cannot be readily distinguished.

(o) "Sound pressure level" of a sound, in decibels, shall mean twenty (20) times the logarithm to the base of ten (10) of the ratio of the pressure of the sound to a reference pressure, which reference pressure shall be explicitly stated. (2379-7/79)

8.40.030 Noise level measurement criteria. Any noise level measurements made pursuant to the provisions of this chapter shall be performed using a sound level meter as defined in this chapter. The location selected for measuring exterior noise levels shall be at any point on the property line of the offender or anywhere on the affected property. Interior noise measurements shall be made within the affected unit. The measurement shall be made at a point in the affected unit at least four (4) feet from the wall, ceiling or floor nearest the noise source. All noise level measurements shall be performed in accordance with procedural rules and regulations of the Orange County Health Department. (2379-7/79)

8.40.040 Designated noise zones. The properties hereinafter described, whether within or without the City, are hereby assigned to the following noise zones:

Noise Zone 1: All residential properties;

Noise Zone 2: All professional office and public institutional properties;

Noise Zone 3: All commercial properties with the exception of professional office properties;and

Noise Zone 4: All industrial properties. (2379-7/79)

8.40.050 Exterior noise standards.

(a) The following noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone:

Exterior Noise Standards		
Noise Zone	**Noise Level**	**Time Period**
1	55 db(A)	7 a.m. - 10 p.m.
	50 db(A)	10 p.m. - 7 a.m.
2	55 db(A)	Anytime
3	60 db(A)	Anytime
4	70 db(A)	Anytime

(b) In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five (5) db(A). (2379-8/79, 2788-9/85)

8.40.060 Exterior noise levels prohibited. It shall be unlawful for any person at any location within the incorporated area of the City to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, which causes the noise level when measured on any residential, public institutional, professional, commercial or industrial property, either within or without the City, to exceed the applicable noise standards:

(a) For a cumulative period of more than thirty (30) minutes in any hour;

(b) Plus 5 db(A) for a cumulative period of more than fifteen (15) minutes in any hour;

(c) Plus 10 db(A) for a cumulative period of more than five (5) minutes in any hour;

(d) Plus 15 db(A) for a cumulative period of more than one (1) minute in any hour; or

(e) Plus 20 db(A) for any period of time.

In the event the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level. (2379-7/79)

8.40.070 Interior noise standards.

(a) The following noise standards, unless otherwise specifically indicated, shall apply to all real property within a designated noise zone:

Interior Noise Standards		
Noise Zone	**Noise Level**	**Time Period**
1	55 db(A)	7 a.m. -10 p.m.
	45 db(A)	10 p.m. - 7 a.m.
2, 3, 4	55 db(A)	Anytime

ATTACHMENT NO. 5.42

(b) In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five (5) db(A). (2379-7/79, 2788-9/85)

8.40.080 Interior levels of noise prohibited. It shall be unlawful for any person at any location within the incorporated area of the City to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, which causes the noise level when measured within any other structure on any residential, public institutional, commercial, or industrial property to exceed:

(a) The noise standard for a cumulative period of more than five minutes in any hour;

(b) The noise standards plus 5 db(A) for a cumulative period of more than one (1) minute in any hour; or

(c) The noise standard plus 10 db(a) for any period of time.

In the event the ambient noise level exceeds either of the first two noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the third noise level, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

Each of the noise limits specified above shall be reduced by 5 db(A) for impact or predominant tone noises, or for noises consisting of speech or music.

In the event that the noise source and the affected property are within different noise zones, the noise standards of the affected property shall apply. (2379-7/79)

8.40.090 Special provisions. The following activities shall be exempt from the provisions of this chapter:

(a) School bands, school athletics and school entertainment events, provided such events are conducted on school property or authorized by special permit from the City;

(b) Activities otherwise lawfully conducted in public parks, public playgrounds and public or private school grounds;

(c) Any mechanical device, apparatus or equipment used, related to or connected with emergency machinery, vehicle or work;

(d) Noise sources associated with construction, repair, remodeling, or grading of any real property; provided a permit has been obtained from the City; and provided said activities do not take place between the hours of 8 p.m. and 7 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday.

(e) All mechanical devices, apparatus or equipment which are utilized for the protection or harvest of agricultural crops during periods of potential or actual frost damage or other adverse weather conditions;

(f) Mobile noise sources associated with agricultural operations provided such operations do not take place between the hours of 8 p.m. and 7 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday.

(g) Mobile noise sources associated with agricultural pest control through pesticide application, provided that the application is made in accordance with restricted material permits issued by or regulations enforced by the Agricultural Commissioner;

(h) Noise sources associated with the maintenance of real property provided said activities take place between the hours of 8 a.m. and 8 p.m. on any day except Sunday or between the hours of 9 a.m. and 6 p.m. on Sunday or a federal holiday;

(i) Leaf blower shall be governed by section 8.40.095. (3131-4/92)

(j) Any activity or equipment to the extent that design regulation thereof has been pre-empted by state or federal laws. (2379-7/79)

8.40.095 Leaf blowers. (3131-4/92)

(a) Definitions. As used in this section, the following terms shall have meanings as set forth below: (3131-4/92)

(1) "Leaf blower" means any machine, however powered, used to blow leaves, dirt and other debris off sidewalks, driveways, lawns and other surfaces. (3131-4/92)

(2) "Parcel" means an area of real property with a separate or distinct number or other designation shown on a plat recorded in the office of the County Recorder. Contiguous parcels owned by the same individual or entity shall be considered one parcel for purposes of this section. (3131-4/92)

(b) Unlawful to propel debris beyond parcel boundary. It shall be unlawful for any person to use or operate any leaf blower in such a manner as to blow, dispel or make airborne, dust, leaves, grass cuttings, paper, trash or any other type of unattached debris or material, beyond the parcel boundaries of the parcel being cleaned, unless the consent of the adjoining owner or person in possession is obtained. It shall be unlawful for any person to use or operate any leaf blower within the City in such a way as to blow leaves, dirt and other debris onto the public rights-of-way or private property and to allow such debris to remain there in excess of thirty (30) minutes. (3131-4/92)

(c) Special prohibitions. It shall be unlawful for any person to operate a leaf blower within a residential zone or within one hundred feet of a residential zone of the City of Huntington Beach, except under the following conditions: (3131-4/92)

(1) Time restriction. Noise sources associated with the maintenance of real property provided said activities take place between the hours of 8:00 A.M. and 8:00 P.M. on any day except Sunday or between the hours of 9:00 A.M. and 6:00 P.M. on Sunday or a federal holiday. (3131-4/92)

(2) Distance restriction. Leaf blowers shall not be operated within a horizontal distance of ten (10) feet of any operable window, door, or mechanical air intake opening or duct; (3131-4/92)

(3) Duration of use restriction. Leaf blowers shall not be operated for more than fifteen (15) minutes per hour, per day, on parcels less than one-half acre and no more than thirty (30) minutes per hour on parcels greater than one-half acre up to one acre. Leaf blowers shall not be operated for more than two (2) hours on parcels of one acre or more. (3131-4/92)

(4) Number restriction. No person shall operate more than one (1) leaf blower per parcel on one-half acre, no more than two (2) leaf blowers on parcels greater than one-half acre and no more than three (3) leaf blowers on parcels greater than one acre or more. (3131-4/92)

(5) The maximum decibel level of 70 dba as measured ten (10) feet from the leaf blower shall not be exceeded. (3131-4/92)

8.40.100 Schools, hospitals and churches--Special provisions. It shall be unlawful for any person to create any noise which causes the noise level at any school, hospital or church while same is in use, to exceed the noise limits specified for exterior noise standards in this chapter, or which noise level unreasonably interferes with the use of such institutions or which unreasonably disturbs or annoys patients in the hospital, provided conspicuous signs are displayed in three (3) separate locations within one-tenth (1/10) of a mile of the institution indicating the presence of a school, hospital or church. (2379-7/79)

8.40.110 Air conditioning, refrigeration--Special provisions. During a one (1) year period following the effective date of this chapter, the noise level standards specified in this chapter shall be increased by 5 db(A) where the alleged noise source is an air-conditioning apparatus or refrigeration system, which was installed prior to the effective date of this chapter. (2379-7/79)

8.40.111 Prohibited noises. Notwithstanding any other provisions of this chapter and in addition thereto, it shall be unlawful for any person to willfully make or continue, or cause to be made or continued, any loud, unnecessary or unusual noise which disturbs the peace or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area. (3216-12/93)

The standard which may be considered in determining whether a violation of the provisions of this section exists may include, but not be limited to, the following: (3216-12/93)

(a) The level of the noise; (3216-12/93)

(b) Whether the nature of the noise is usual or unusual; (3216-12/93)

(c) Whether the origin of the noise is natural or unnatural; (3216-12/93)

(d) The level and intensity of the background noise, if any; (3216-12/93)

(e) The proximity of the noise to residential sleeping facilities; (3216-12/93)

(f) The nature and zoning of the area within which the noise emanates; (3216-12/93)

(g) The density of the inhabitation of the area within which the noise emanates; (3216-12/93)

(h) The time of the day and night the noise occurs; (3216-12/93)

(i) The duration of the noise; (3216-12/93)

(j) Whether the noise is recurrent, intermittent or constant; and (3216-12/93)

(k) Whether the noise is produced by a commercial or noncommercial activity. (3216-12/93)

8.40.112 Loud noises. It shall be unlawful for any person to: (3514-12/01)

(a) Use, operate, or permit to be operated any radio, receiving set or device, television set, musical instrument, phonograph, CD, DVD, tape player, juke box, or other machine or device for producing or reproducing sound in such a manner as to distrub the peace, quiet, and comfort of other persons. (3514-12/01)

(b) Make or allow to be made any noise which continues for more than a five minute period between the hours of 10PM and 7AM if such noise is audible for fifty feet or more from the source of the noise. (3514-12/01)

(c) Maintain, manage, or control any business or residential property in violation of sections (a) or (b). (3514-12/01)

(d) Own, maintain, control, operate, take care or custody of, or otherwise provide any premises, and allow noise to continue after being informed, anytime within the preceding thirty days by the Police Department, that a violation of this chapter has been committed on said premises. (3514-12/01)

(e) Violations of this section are hereby declared a nuisance. (3514-12/01)

8.40.120 Manner of enforcement. Except for Sections 8.40.111 and 8.40.112, the Orange County Health Officer and his duly authorized representatives are directed to enforce the provisions of this chapter. The Orange County Health Officer and his duly authorized representatives are authorized pursuant to Penal Code section 836.5 to arrest any person without a warrant when they have reasonable cause to believe that such person has committed a misdemeanor in their presence. (3216-12/93)

If the Orange County Health Officer or his duly authorized representatives conduct db(A) tests or readings for purposes of enforcement, and the noise level is found to exceed those levels stipulated as permissible in this chapter, the owner or operator of the noise source shall be required to pay the cost of the db(A) tests or readings.

No person shall interfere with, oppose or resist any authorized person charged with the enforcement of this chapter while such person is engaged in the performance of his duty. (2379-7/79, 2533-2/82)

8.40.130 Variance procedure. The owner or operator of a noise source which violates any of the provisions of this chapter may file an application with the Health Officer for a variance from the provisions thereof wherein said owner or operator shall set forth all actions taken to comply with said provisions, the reasons why immediate compliance cannot be achieved, a proposed method of achieving compliance, and a proposed time schedule for its accomplishment. Said application shall be accompanied by a fee in the amount of seventy-five dollars ($75).

A separate application shall be filed for each noise source; provided, however, that several mobile sources under common ownership, or several fixed sources on a single property may be combined into one application. Upon receipt of said application and fee, the Health Officer shall refer it with his recommendation thereon in accordance with the provisions of this chapter.

An applicant for a variance shall remain subject to prosecution under the terms of this chapter until a variance is granted. (2379-7/79)

8.40.140 Noise variance board. The noise Variance Board shall evaluate all applications for variance from the requirements of this chapter and may grant said variances with respect to time for compliance, subject to such terms, conditions and requirements as it may deem reasonable to achieve maximum compliance with the provisions of this chapter. Said terms, conditions and requirements may include, but shall not be limited to, limitations on noise levels and operating hours. Each such variance shall set forth in detail the approved method of achieving maximum compliance and a time schedule for its accomplishment.

In its determination said board shall consider the magnitude of nuisance caused by the offensive noise; the uses of property within the area of impingement by the noise; the time factors related to study, design, financing and construction of remedial work; the economic factors related to age and useful life of equipment; and the general public interest and welfare. Any variance granted by said board shall be by resolution and shall be transmitted to the Health Officer for enforcement. Any violation of the terms of said variance shall be unlawful.

Members of the Variance Board shall be appointed by, and shall serve at the pleasure of the Orange County board of supervisors. The Variance Board shall adopt reasonable rules and regulations for its own procedures in carrying out its functions under the provisions of this chapter.

Three (3) members shall constitute a quorum and at least three (3) affirmative votes shall be required in support of any action.

The Health Officer, or his appointed representative, shall be a nonvoting ex officio member of the Variance Board, and shall act as secretary of the board.

Meetings of the noise Variance Board shall be held at the call of the secretary and at such times and locations as said board shall determine. All such meetings shall be open to the public. (2379-7/79)

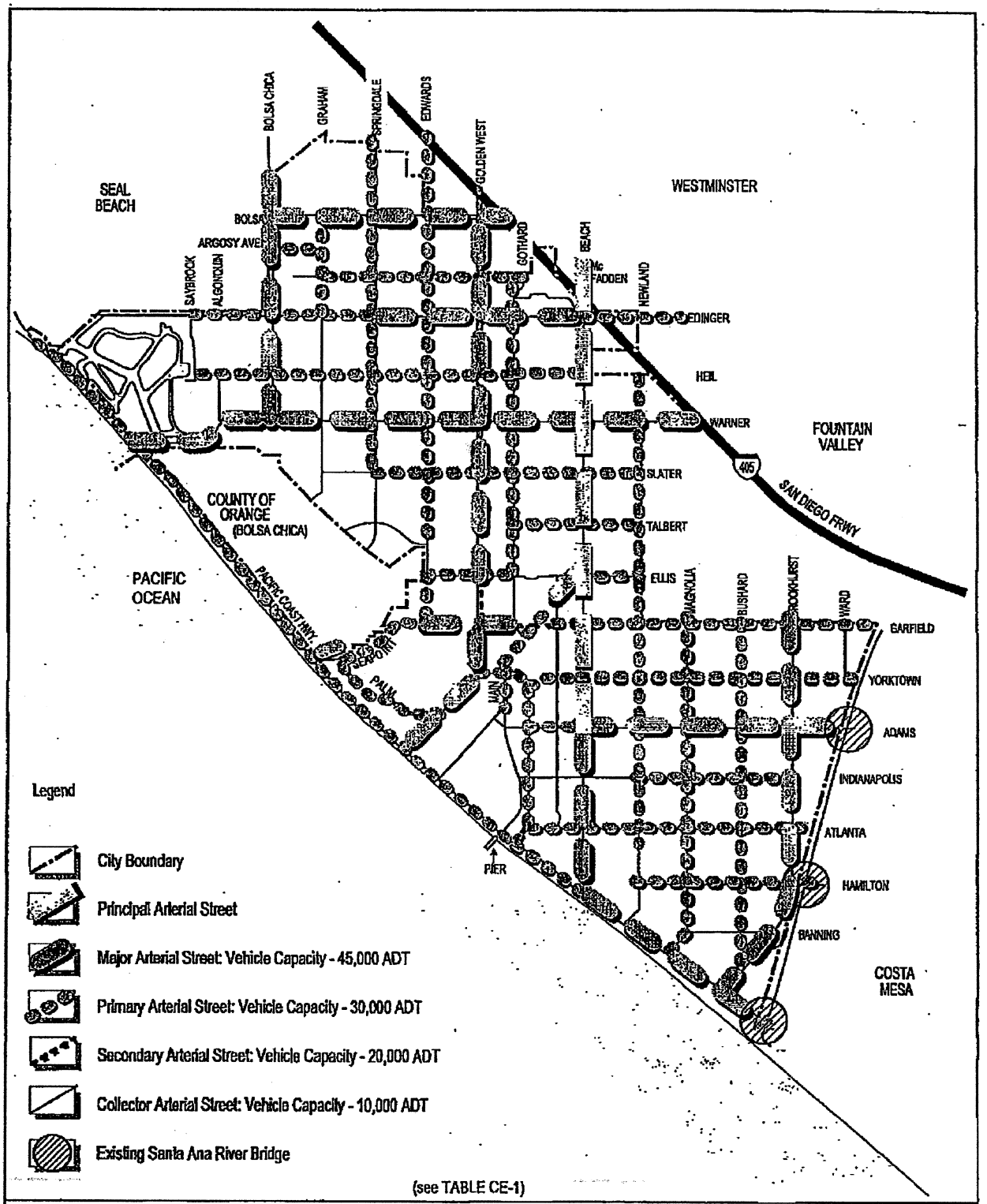
8.40.150 Appeals. Within fifteen (15) days following notice to the City of the decision of the Variance Board on an application, the applicant, the Health Officer, or any member of the City Council, may appeal the decision to the City Council by filing a notice of appeal with the secretary of the Variance Board. In the case of an appeal by the applicant for a variance, the notice of appeal shall be accompanied by a fee to be computed by the secretary on the basis of the estimated cost of preparing the materials required to be forwarded to the City Council as discussed hereafter. If the actual cost of such preparation differs from the estimated cost, the applicant shall pay the difference to the secretary and the secretary shall pay the amount of any excess to the applicant. (2379-7/79)

8.40.160 Appeals--Notice of hearing. Within fifteen (15) days following the receipt of a notice of appeal and the appeal fee, the secretary of the Variance Board shall forward to the City Council copies of the application for variance; the recommendation of the Health Officer; the notice of appeal; all evidence concerning said application received by the Variance Board and its decision thereon. In addition, any person may file with the City Council written arguments supporting or attacking said decision and the City Council may, in its discretion, hear oral arguments thereon. The City Clerk shall mail to the applicant a notice of the date set for hearing of the appeal. The notice shall be mailed at least ten (10) days prior to the hearing date. (2379-7/79)

8.40.170 Action of Council. Within sixty (60) days following its receipt of the notice of the appeal, the City Council shall either affirm, modify or reverse the decision of the Variance Board at a duly noticed public hearing. Such decision shall be based upon the City Council's evaluation of the matters submitted to it in light of the powers conferred on the Variance Board and the factors to be considered as set out in this chapter.

As part of its decision, the council may direct the Variance Board to conduct further proceedings on said application. Failure of the City Council to affirm, modify or reverse the decision of the Variance Board within said sixty (60) day period shall constitute affirmation of the board's decision. (2379-7/79)

8.40.180 Violations--Misdemeanor. Any person violating any of the provisions of this chapter shall be deemed guilty of a MISDEMEANOR. Each day such violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such. The provisions of this chapter shall not be construed as permitting conduct not proscribed herein and shall not affect the enforceability of any other applicable provisions of law. (2379-7/79)

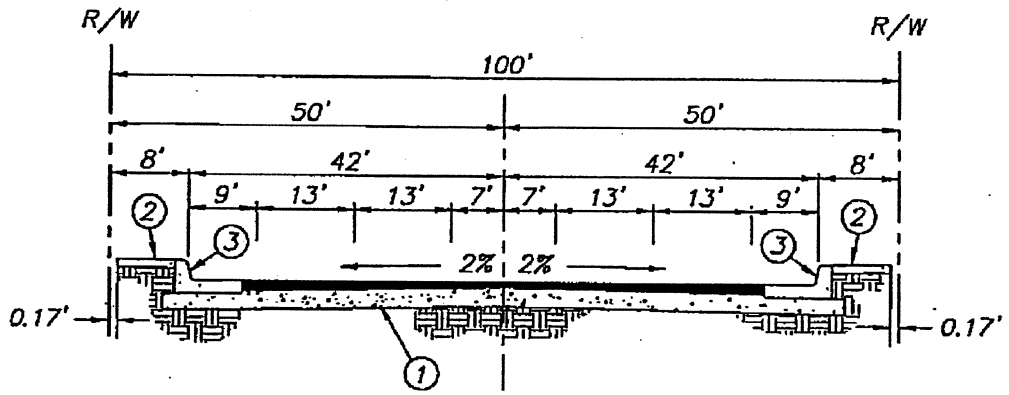


EXISTING NETWORK OF ARTERIAL STREETS AND HIGHWAYS

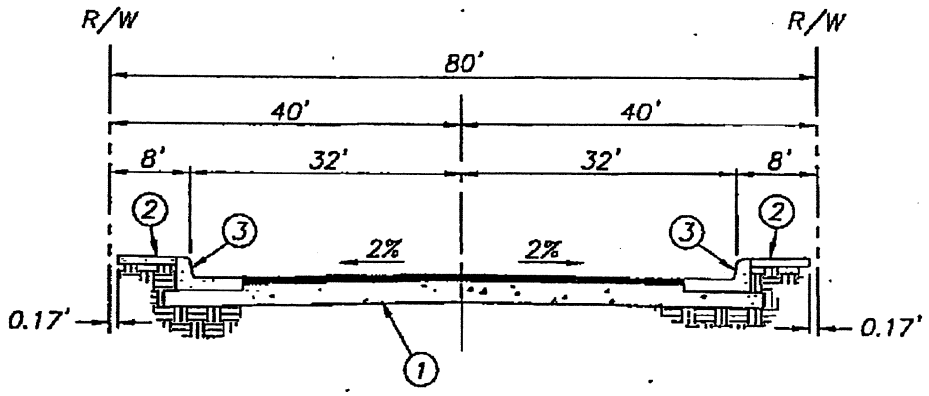
CITY OF HUNTINGTON BEACH GENERAL PLAN

FIGURE CE-1

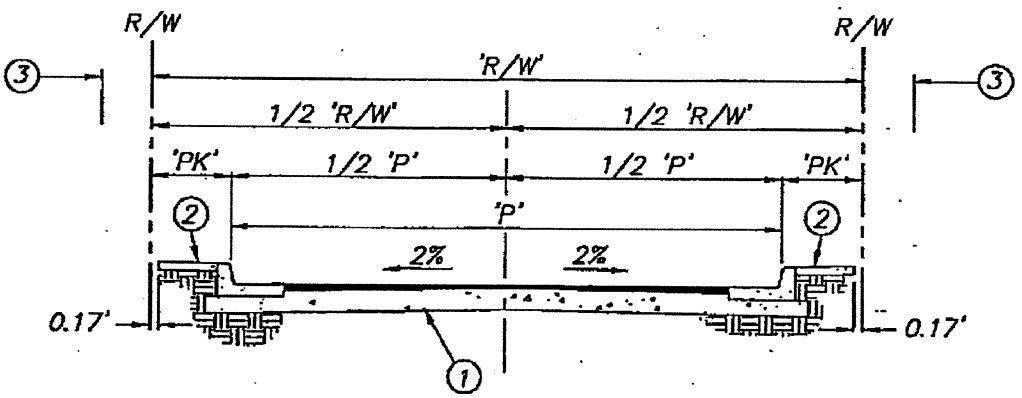
ATTACHMENT NO. 5.48



PRIMARY ARTERIAL STREET



SECONDARY ARTERIAL STREET



COLLECTOR ARTERIAL STREET

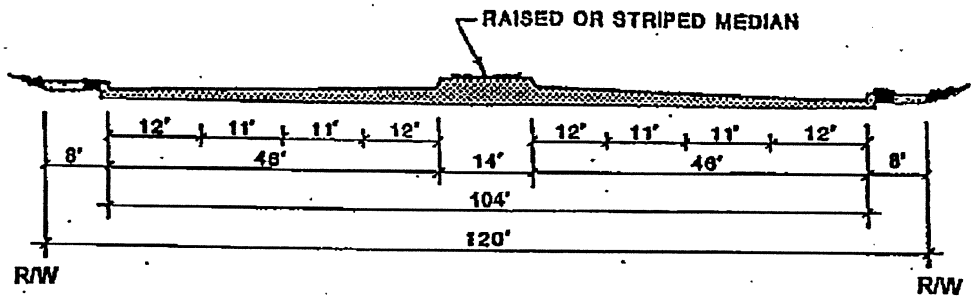
(see CE 12.1)

TYPICAL ROADWAY SECTIONS

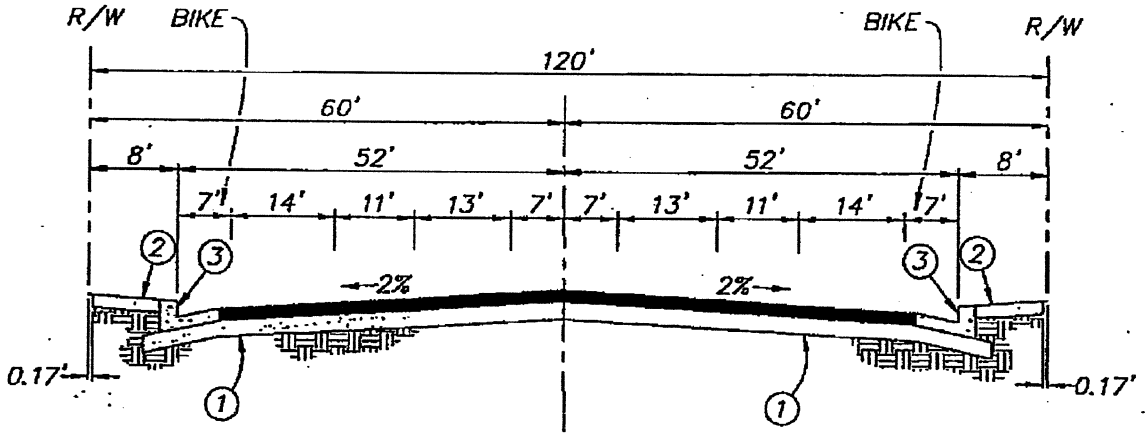
CITY OF HUNTINGTON BEACH GENERAL PLAN

FIGURE CE-6a

ATTACHMENT NO. 5.49



PRINCIPAL ARTERIAL STREET



MAJOR ARTERIAL STREET

(see CE1.2.1)

TYPICAL ROADWAY SECTIONS

CITY OF HUNTINGTON BEACH GENERAL PLAN

FIGURE CE-6b

ATTACHMENT NO. 5.50

Appendix B

Glossary of Acoustical Terms

ATTACHMENT NO. 5.51

A-Weighted Sound Level
The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear. A numerical method of rating human judgment of loudness.

Ambient Noise Level
The composite of noise from all sources, near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

Community Noise Equivalent Level (CNEL)
The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five (5) decibels to sound levels in the evening from 7:00 to 10:00 PM and after addition of ten (10) decibels to sound levels in the night before 7:00 AM and after 10:00 PM.

Decibel (dB)
A unit for measuring the amplitude of a sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micro-pascals.

dB(A)
A-weighted sound level (see definition above).

Equivalent Sound Level (LEQ)
The sound level corresponding to a steady noise level over a given sample period with the same amount of acoustic energy as the actual time varying noise level. The energy average noise level during the sample period.

Habitable Room
Any room meeting the requirements of the Uniform Building Code or other applicable regulations which is intended to be used for sleeping, living, cooking or dining purposes, excluding such enclosed spaces as closets, pantries, bath or toilet rooms, service rooms, connecting corridors, laundries, unfinished attics, foyers, storage spaces, cellars, utility rooms and similar spaces.

L(n)
The A-weighted sound level exceeded during a certain percentage of the sample time. For example, L10 in the sound level exceeded 10 percent of the sample time. Similarly L50, L90 and L99, etc.

Noise
Any unwanted sound or sound which is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying. The State Noise Control Act defines noise as "...excessive undesirable sound...".

Outdoor Living Area
Outdoor spaces that are associated with residential land uses typically used for passive recreational activities or other noise-sensitive uses. Such spaces include patio areas, barbecue areas, jacuzzi areas, etc. associated with residential uses; outdoor patient recovery or resting areas associated with hospitals, convalescent hospitals, or rest homes; outdoor areas associated with places of worship which have a significant role in services or other noise-sensitive activities; and outdoor school facilities routinely used for educational purposes which may be adversely impacted by noise. Outdoor areas usually not included in this definition are: front yard areas, driveways, greenbelts, maintenance areas and storage areas associated with residential land uses; exterior areas at hospitals that are not used for patient activities; outdoor areas associated with places of worship and principally used for short-term social gatherings; and, outdoor areas associated with school facilities that are not typically associated with educational uses prone to adverse noise impacts (for example, school play yard areas).

Percent Noise Levels
See L(n).

Sound Level (Noise Level)
The weighted sound pressure level obtained by use of a sound level meter having a standard frequency-filter for attenuating part of the sound spectrum.

Sound Level Meter
An instrument, including a microphone, an amplifier, an output meter, and frequency weighting networks for the measurement and determination of noise and sound levels.

Single Event Noise Exposure Level (SENEL)
The dB(A) level which, if it lasted for one second, would produce the same A-weighted sound energy as the actual event.

Appendix C

Photographs and Field Measurements

ATTACHMENT NO. 3.54

NOISE LEVEL MEASUREMENTS

Project: ARCO FACILITY AND CAR WASH
Acoustical Study

Date: 7/21/08
Job No.: 2093-08-01
Prepared By: Bryan Estrada

Job Location: Located on the Northeast corner of Brookhurst Street and Hamilton Avenue
City of Huntington Beach, CA

Site	Start Time	End Time	L_{eq}	L_{max}	L_{min}	L_2	L_8	L_{25}	L_{50}
1	11:04am	11:14am	53.0	72.2	46.9	56.9	55.0	53.0	51.6

Comments: 72°F, clear sunny skies. Measurement taken at Sea Spray Condominiums. Noise meter approximately 20' from façade of condominiums. Ambient noise from Hamilton Avenue.

Site	Start Time	End Time	L_{eq}	L_{max}	L_{min}	L_2	L_8	L_{25}	L_{50}
1	10:05pm	10:15pm	48.8	64.9	42.0	55.2	51.0	48.9	47.4

Comments: 65°F, overcast skies. Measurement taken at Sea Spray Condominiums. Noise meter approximately 20' from façade of condominiums. Ambient noise from Hamilton Avenue. Noise from residents inside condos.

Site	Start Time	End Time	L_{eq}	L_{max}	L_{min}	L_2	L_8	L_{25}	L_{50}
2	11:38am	11:48am	64.0	75.0	57.8	69.5	67.9	64.7	62.3

Comments: 72°F, clear sunny skies. Measurement taken on Project Site. Noise meter approximately 25' from easterly property line and 50' from northerly property line. Noise from existing Arco facility, Brookhurst Street and Hamilton Avenue.

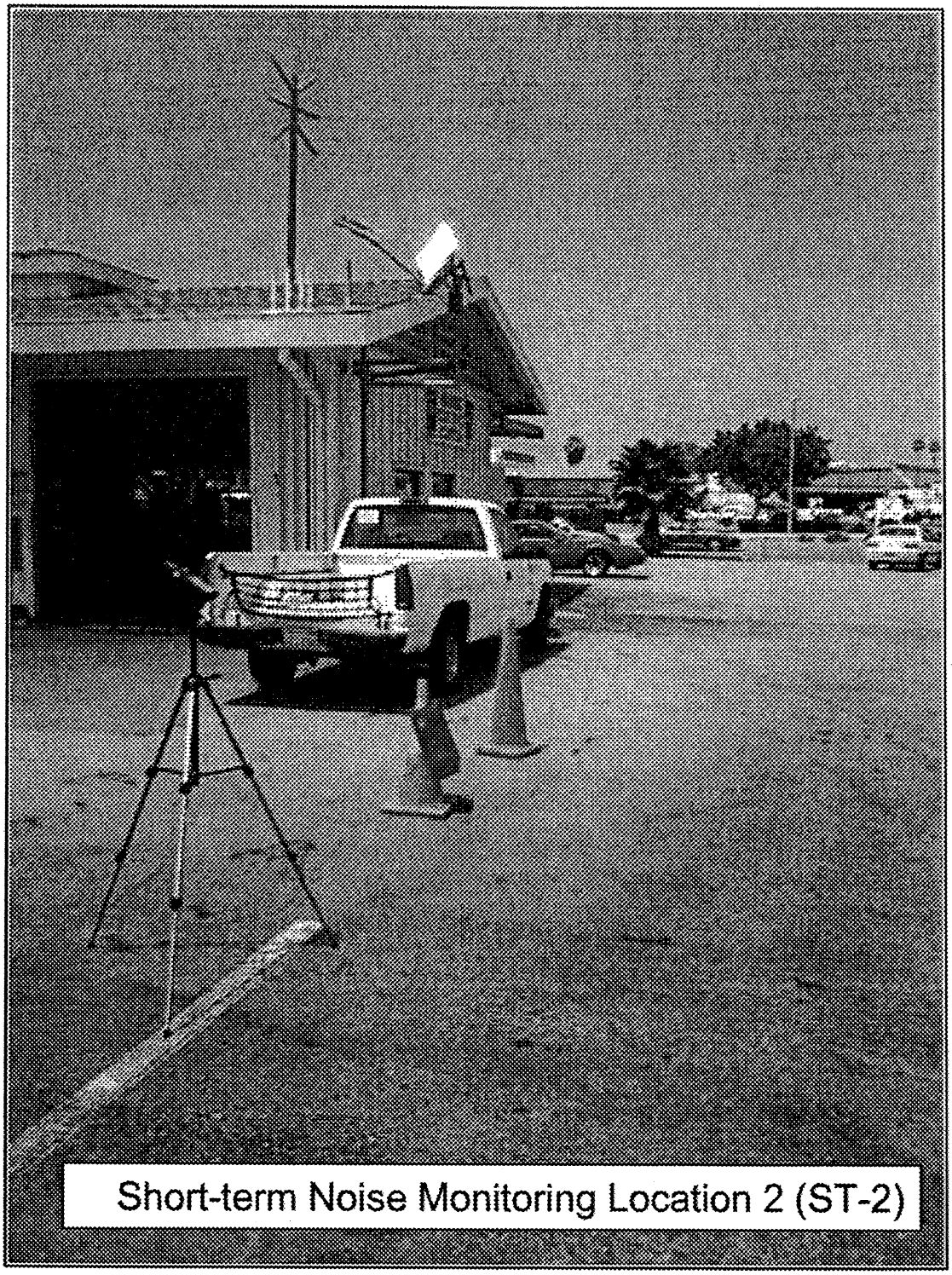
Site	Start Time	End Time	L_{eq}	L_{max}	L_{min}	L_2	L_8	L_{25}	L_{50}
2	10:22pm	10:32pm	59.8	73.9	56.1	65.7	62.2	59.6	58.1

Comments: 65°F, overcast skies. Measurement taken on Project Site. Noise meter approximately 25' from easterly property line and 50' from northerly property line. Noise from Arco facility equipment, Brookhurst Street and Hamilton Avenue.

ATTACHMENT NO. 555

Short-term Noise Monitoring Location 1 (ST-1)

ATTACHMENT NO. 5.56



Short-term Noise Monitoring Location 2 (ST-2)

ATTACHMENT NO. 557

Appendix D

Noise Calculations Worksheets

ATTACHMENT NO. ~~5.58~~

2093-08-01 - NOISE LEVEL ADDITION (dBA)

Residential Units - 1st Floor - Day (w/ existing wall)

Leq

Source	Noise Level (dBA)	10^dBA/10
Ambient	53.0	199,526.2
Car Wash Equipment(adjusted nois	42.7	18,620.9
Combined Noise Level (dBA) =	53.4	218,147.1

Lmax

Source	Noise Level (dBA)	10^dBA/10
Ambient	72.2	16,595,869.1
Car Wash Equipment(adjusted nois	46.4	43,651.6
Combined Noise Level (dBA) =	72.2	16,639,520.7

L2

Source	Noise Level (dBA)	10^dBA/10
Ambient	56.9	489,778.8
Car Wash Equipment(adjusted nois	45.7	37,153.5
Combined Noise Level (dBA) =	57.2	526,932.3

L8

Source	Noise Level (dBA)	10^dBA/10
Ambient	55.0	316,227.8
Car Wash Equipment(adjusted nois	44.9	30,903.0
Combined Noise Level (dBA) =	55.4	347,130.7

L25

Source	Noise Level (dBA)	10^dBA/10
Ambient	53.0	199,526.2
Car Wash Equipment(adjusted nois	43.9	24,547.1
Combined Noise Level (dBA) =	53.5	224,073.3

L50

Source	Noise Level (dBA)	10^dBA/10
Ambient	51.6	144,544.0
Car Wash Equipment(adjusted nois	42.9	19,498.4
Combined Noise Level (dBA) =	52.1	164,042.4

ATTACHMENT NO. 5.59

2093-08-01 - NOISE LEVEL ADDITION (dBA)

Residential Units - 1st Floor - Night (w/ existing wall)

Leq

Source	Noise Level (dBA)	10^dBA/10
Ambient	48.8	75,857.8
Car Wash Equipment(adjusted nois	42.7	18,620.9
Combined Noise Level (dBA) =	49.8	94,478.6

Lmax

Source	Noise Level (dBA)	10^dBA/10
Ambient	64.9	3,090,295.4
Car Wash Equipment(adjusted nois	46.4	43,651.6
Combined Noise Level (dBA) =	65.0	3,133,947.0

L2

Source	Noise Level (dBA)	10^dBA/10
Ambient	55.2	331,131.1
Car Wash Equipment(adjusted nois	45.7	37,153.5
Combined Noise Level (dBA) =	55.7	368,284.6

L8

Source	Noise Level (dBA)	10^dBA/10
Ambient	51.0	125,892.5
Car Wash Equipment(adjusted nois	44.9	30,903.0
Combined Noise Level (dBA) =	52.0	156,795.5

L25

Source	Noise Level (dBA)	10^dBA/10
Ambient	48.9	77,624.7
Car Wash Equipment(adjusted nois	43.9	24,547.1
Combined Noise Level (dBA) =	50.1	102,171.8

L50

Source	Noise Level (dBA)	10^dBA/10
Ambient	47.4	54,954.1
Car Wash Equipment(adjusted nois	42.9	19,498.4
Combined Noise Level (dBA) =	48.7	74,452.5

ATTACHMENT NO. 5.60

2093-08-01 - NOISE LEVEL ADDITION (dBA)

Residential Units - 2nd Floor - Day (w/ existing wall)

Leq

Source	Noise Level (dBA)	10^dBA/10
Ambient	53.0	199,526.2
Car Wash Equipment(adjusted nois	45.7	37,153.5
Combined Noise Level (dBA) =	53.7	236,679.8

Lmax

Source	Noise Level (dBA)	10^dBA/10
Ambient	72.2	16,595,869.1
Car Wash Equipment(adjusted nois	49.4	87,096.4
Combined Noise Level (dBA) =	72.2	16,682,965.4

L2

Source	Noise Level (dBA)	10^dBA/10
Ambient	56.9	489,778.8
Car Wash Equipment(adjusted nois	48.7	74,131.0
Combined Noise Level (dBA) =	57.5	563,909.8

L8

Source	Noise Level (dBA)	10^dBA/10
Ambient	55.0	316,227.8
Car Wash Equipment(adjusted nois	47.9	61,659.5
Combined Noise Level (dBA) =	55.8	377,887.3

L25

Source	Noise Level (dBA)	10^dBA/10
Ambient	53.0	199,526.2
Car Wash Equipment(adjusted nois	46.9	48,977.9
Combined Noise Level (dBA) =	54.0	248,504.1

L50

Source	Noise Level (dBA)	10^dBA/10
Ambient	51.6	144,544.0
Car Wash Equipment(adjusted nois	45.9	38,904.5
Combined Noise Level (dBA) =	52.6	183,448.5

ATTACHMENT NO. 5.6

2093-08-01 - NOISE LEVEL ADDITION (dBA)

Residential Units - 2nd Floor - Night (w/ existing wall)

Leq

Source	Noise Level (dBA)	10^dBA/10
Ambient	48.8	75,857.8
Car Wash Equipment(adjusted nois	45.7	37,153.5
Combined Noise Level (dBA) =	50.5	113,011.3

Lmax

Source	Noise Level (dBA)	10^dBA/10
Ambient	64.9	3,090,295.4
Car Wash Equipment(adjusted nois	49.4	87,096.4
Combined Noise Level (dBA) =	65.0	3,177,391.8

L2

Source	Noise Level (dBA)	10^dBA/10
Ambient	55.2	331,131.1
Car Wash Equipment(adjusted nois	48.7	74,131.0
Combined Noise Level (dBA) =	56.1	405,262.1

L8

Source	Noise Level (dBA)	10^dBA/10
Ambient	51.0	125,892.5
Car Wash Equipment(adjusted nois	47.9	61,659.5
Combined Noise Level (dBA) =	52.7	187,552.0

L25

Source	Noise Level (dBA)	10^dBA/10
Ambient	48.9	77,624.7
Car Wash Equipment(adjusted nois	46.9	48,977.9
Combined Noise Level (dBA) =	51.0	126,602.6

L50

Source	Noise Level (dBA)	10^dBA/10
Ambient	47.4	54,954.1
Car Wash Equipment(adjusted nois	45.9	38,904.5
Combined Noise Level (dBA) =	49.7	93,858.6

ATTACHMENT NO. 5.62

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	ARCO FACILITY AND CAR WASH	JOB #:	2093-08-01
SOURCE:	CAR WASH (reference-adjusted levels)	DATE:	24-Jul-08
LOCATION:	1st FLOOR EXTERIOR RESIDENTIAL UNITS	BY:	Mike Dickerson

OBS DIST=	130.0			
DT WALL=	55.0			
DT W/OB=	75.0			
HTH WALL=	10.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	5.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	-7.90
NOISE EL =	0.0		NOISE HTH EL=	5.0
DROP-OFF=	20.0	(20 = 6.0 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE LEVELS (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	15	69.4	73.1	72.4	71.6	70.6	69.6
PROJ LEVEL	130	50.6	54.3	53.6	52.8	51.8	50.8
SHIELDING	130	-7.9	-7.9	-7.9	-7.9	-7.9	-7.9
ADJ LEVEL	130	42.7	46.4	45.7	44.9	43.9	42.9

ATTACHMENT NO. ~~5.63~~

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	ARCO FACILITY AND CAR WASH	JOB #:	2093-08-01
SOURCE:	CAR WASH (reference-adjusted levels)	DATE:	24-Jul-08
LOCATION:	2nd FLOOR EXTERIOR RESIDENTIAL UNITS	BY:	Mike Dickerson

OBS DIST=	130.0			
DT WALL=	55.0			
DT W/OB=	75.0			
HTH WALL=	10.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	15.0			
NOISE HTH=	5.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	-4.96
NOISE EL =	0.0		NOISE HTH EL=	5.0
DROP-OFF=	20.0	(20 = 6.0 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE LEVELS (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	15	69.4	73.1	72.4	71.6	70.6	69.6
PROJ LEVEL	130	50.6	54.3	53.6	52.8	51.8	50.8
SHIELDING	130	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0
ADJ LEVEL	130	45.7	49.4	48.7	47.9	46.9	45.9

ATTACHMENT NO. 5b4

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	ARCO FACILITY AND CAR WASH	JOB #:	2093-08-01
SOURCE:	CAR WASH (reference-adjusted levels)	DATE:	24-Jul-08
LOCATION:	KFC FAST FOOD RESTAURANT	BY:	Mike Dickerson

OBS DIST=	15.0			
DT WALL=	0.0			
DT W/OB=	15.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	5.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	0.0		NOISE HTH EL=	5.0
DROP-OFF=	20.0	(20 = 6.0 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE LEVELS (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	15	69.4	73.1	72.4	71.6	70.6	69.6
PROJ LEVEL	15	69.4	73.1	72.4	71.6	70.6	69.6
SHIELDING	15	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	15	69.4	73.1	72.4	71.6	70.6	69.6

ATTACHMENT NO. 5.65

Appendix E

Roadway Noise Calculations

ATTACHMENT NO. 5.66

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT:	ARCO FACILITY AND CAR WASH ACOUSTICAL	JOB #:	2093-2008-01
ROADWAY:	HAMILTON AVENUE	DATE:	23-Jul-08
LOCATION:	ARCO GAS STATION	BY:	M. DICKERSON

NOISE INPUT DATA

ADT =	30,000	PK HR VOL =	3,000
SPEED =	45		
PK HR % =	10		
CTL DIST=	100		
DIST N/F=	53	AUTO SLE DISTANCE =	96.47
DT WALL=	100	MED TRUCK SLE DIST=	96.43
DT W/OB=	0	HVY TRUCK SLE DIST=	96.47
HTH WALL=	0.0 ********		
OBS HTH=	5.0		
AMBIENT=	0.0		

ROADWAY VIEW: LF ANGLE= -90
RT ANGLE= 90
DF ANGLE= 180

SITE CONDITIONS (10=HARD SITE, 15=SOFT SITE)

AUTOMOBILES =	15		
MEDIUM TRUCKS =	15	GRADE ADJUSTMENT=	0.00
HEAVY TRUCKS =	15	(ADJUSTMENT TO HEAVY TRUCKS)	
BARRIER =	0 (0=WALL,1=BERM)		
PAD EL =	0.0	EL AUTOMOBILES =	2.0
ROAD EL =	0.0	EL MEDIUM TRUCKS=	4.0
GRADE =	0.0 %	EL HEAVY TRUCKS =	8.0

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCKS	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES LEQ	66.6	64.7	62.9	56.9	65.5	66.1
MEDIUM TRUCKS LEQ	57.6	56.1	49.8	48.2	56.7	56.9
HEAVY TRUCKS LEQ	58.2	56.8	47.7	49.0	57.3	57.5
VEHICULAR NOISE	67.6	65.8	63.2	58.0	66.6	67.1

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
VEHICULAR NOISE	67.6	65.8	63.2	58.0	66.6	67.1

NOISE CONTOUR (FT)

	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	64	138	297	639
LDN	59	127	274	591

	W/O AMBIENT		W/ AMBIENT
PK HR LEQ WITHOUT TOPO OR BARRIER =	67.6		67.6
MIT PK HR LEQ WITH TOPO AND BARRIER =	67.6	*******	67.6
CNEL WITHOUT TOPO AND BARRIER =	67.1		67.1
MIT CNEL WITH TOPO AND BARRIER =	67.1	*******	67.1
LDN WITHOUT TOPO AND BARRIER =	66.6		66.6
MIT LDN WITH TOPO AND BARRIER =	66.6	*******	66.6

ATTACHMENT NO. ~~3.67~~

CNEL CALCULATED FROM SITE MEASUREMENTS

PROJECT: ARCO FACILITY AND CAR WASH ACOUSTICAL DATE: 23-Jul-08
LOCATION: 100-FT FROM HAMILITON AVENUE CENTERLINE JN: 2093-08-01

TIME BEGINNING	HOURLY LEQ	HOURLY LEQ WEIGHTING	ADJUSTED HOURLY LEQ
0000	58.7	10.0	68.7
0100	56.3	10.0	66.3
0200	55.1	10.0	65.1
0300	53.3	10.0	63.3
0400	54.3	10.0	64.3
0500	58.1	10.0	68.1
0600	64.5	10.0	74.5
0700	66.8	0.0	66.8
0800	64.9	0.0	64.9
0900	63.9	0.0	63.9
1000	63.8	0.0	63.8
1100	64.0 *	0.0	64.0
1200	64.1	0.0	64.1
1300	64.2	0.0	64.2
1400	64.4	0.0	64.4
1500	65.6	0.0	65.6
1600	67.1	0.0	67.1
1700	66.8	0.0	66.8
1800	65.1	0.0	65.1
1900	63.7	5.0	68.7
2000	62.6	5.0	67.6
2100	61.9	5.0	66.9
2200	60.9	10.0	70.9
2300	60.3	10.0	70.3
CNEL (dBA)			67.5

HR. MEASURED: 1100 *
MEASURED LEQ: 64.0 *

ATTACHMENT NO. 5.68

Appendix F

Construction Noise Calculations

ATTACHMENT NO. 5.69

Roadway Construction Noise Model (RCNM),Version 1.0

Report date: 07/24/2008
Case Description: ARCO FACILITY AND CAR WASH ACOUSTICAL STUDY

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
RESIDENTIAL UNITS	Residential	60.0	53.0	49.3

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	130.0	5.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Backhoe	64.3	60.3	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A
Total	64.3	60.3	85.0	N/A	85.0	N/A	80.0	N/A	None	N/A	None	N/A	None	N/A

ATTACHMENT NO. ~~5.10~~